

New Hampshire Sample Collection & Preservation Manual for Drinking Water



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New Hampshire Sample Collection & Preservation Manual for Drinking Water



Prepared by

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Table of Contents

	Page
<u>Part 1</u>	Introductory Information
<u>Part 2</u>	1
<u>Part 2</u>	Sampling Containers, Preservatives, and Hold Times
<u>Part 3</u>	7
<u>Part 3</u>	Individual Sampling Standard Operating Procedures
	Microbiology
	14
	Nitrate & Nitrite
	15
	Lead and Copper
	16
	Inorganic Chemicals (IOCs)
	17
	Volatile Organics (VOCs)
	19
	Synthetic Organic Chemicals (SOCs)
	21
	Radon
	24
	Radionuclides
	25
	Total Trihalomethanes (TTHMs)
	26
	Haloacetic Acids (HAA5)
	27
	Total Organic Carbon (TOC)
	28
	Asbestos
	29
	Dioxin
	30
<u>Part 4</u>	Material Safety Data Sheets (MSDS)
	32

New Hampshire
Sample Collection & Preservation Manual
for
Drinking Water

Part 1. Introductory Information

1.0 Introduction

This manual was originally created by the Environmental Protection Agency Region 1, in conjunction with the New England State Water Programs, to address the need for consistency in public drinking water sampling protocols across these states. This version of the manual is specific to the taking of samples for the New Hampshire Drinking Water Program and for sample bottles provided by the New Hampshire Department of Environmental Services (NHDES) Laboratory Services Unit. Other New Hampshire (NH) accredited laboratories may use different sample containers.

1.1 Purpose of this Manual

This document was created to assist sampling personnel in collecting public drinking water samples using standard procedures that comply with federal guidelines.

1.2 Scope of manual

This document summarizes national guidelines and procedures for sampling ground water and surface water supplies for monitoring drinking water quality. Minimum standards for the collection of samples and the monitoring of drinking water are set by federal regulation. State regulations must be at least as stringent as federal regulations and may go beyond the minimum federal criteria.

1.3 Arrangement of Manual

This manual is comprised of four parts. In this first chapter, an overview of the many aspects of sample collection is presented, along with some general guidance to make each sampling event safe for the sampler, representative of the sampling site, and in compliance with federal and state regulations.

Part two of the manual is a chart with color pictures of all the containers used by the NHDES Laboratory for sampling for the public water supply drinking protocols. The chart also describes the containers, the preservatives added by the laboratory prior to sending them, and the maximum hold time for the test.

The third chapter includes detailed sample collection and preservation instructions for each of the biological and chemical substances for which public water supplies must test. Each standard operating procedure (SOP) is a stand-alone document that can be removed from the manual and taken to the field to provide step-by-step instructions in taking a compliant sample.

The fourth part is a compilation of Material Safety Data Sheets (MSDS) for each of the preservatives used in the collection process. These are provided for the safety of the samplers.

2.0 Water System Responsibilities

In general the water system owner is responsible for the following in terms of monitoring:

- performing field tests (if applicable)
- properly collecting all necessary samples in compliance with state and federal regulations
- completing sample paperwork
- submitting samples to accredited laboratories within allowable hold times
- collecting samples for confirmation (if required)
- providing payment for analyses

Although the water system owner may designate another party (such as the certified operator) to submit samples, it is ultimately the responsibility of the system owner to make sure the samples are taken properly and the results are submitted to the state program.

If samples are incorrectly taken or preserved, analyzed by uncertified laboratories, submitted beyond appropriate holding times, submitted with incomplete or inappropriate paperwork, or taken from inappropriate sampling sites, then the samples will be deemed unacceptable and rejected. Failure to submit valid test results to the state program within the required compliance period because samples have been rejected for any reason, may result in a monitoring violation.

Samples received that do not meet temperature requirements may be processed at the laboratory's discretion, but data will be qualified.

3.0 General Sampling Requirements

3.1 Sampler Requirements

3.1.1 In some states, only water supply program staff are authorized to collect compliance samples. Other states require that the sampler be certified. In NH, the only requirement is that the sampler follow all standard operating procedures.

3.1.2 Before collecting any samples, all samplers should receive thorough training in proper sampling protocol. This training should include segments on proper procedures for storage and filling of sample containers, handling of preservatives, safety protocols, cleaning of sampling and field equipment, disposal of excess preservatives, and packaging and shipping requirements.

3.1.3 Measuring devices, such as pH or conductivity meters, used for field monitoring must be maintained and calibrated daily, or as specified by the manufacturer, following the manufacturer's instructions. Probes must be washed with deionized water after

each use and stored according to instructions. Other equipment items used to collect samples also must be rinsed with deionized water and kept clean between sampling events to prevent contamination of the samples.

3.1.4 Appropriate sample containers must be used. Generally, your laboratory will provide sample containers that have been specially prepared, depending on the end use (e.g. bacteria bottles are sterilized, metals containers are acid washed and bottles used for VOCs and SOC are triple-rinsed with organic solvents). These containers should not be opened until the actual sampling event.

3.1.5 Field blanks for applicable Synthetic Organic Chemical (SOC) and Volatile Organic Chemicals (VOC) methods are available upon request. Field blanks are a preserved sample of lab pure water taken to the field under the same conditions as a real sample to determine if any environmental conditions, such as gasoline, contaminate the sample. Because field blanks add an additional cost to the associated test, many public water systems choose not to use them for regular sampling events. If a VOC or SOC contaminant is found in a sample, then a field blank is required to accompany the confirmation sample and the system will be invoiced accordingly.

3.2 Laboratory Requirements

3.2.1 Only laboratories accredited by the state or state principal laboratories, are allowed to perform compliance testing for microbiology, inorganic, organic, and radiochemistry parameters. Turbidity, chlorine residual, and pH monitoring are some exceptions to the laboratory certification requirements for performing analyses. Any person acceptable to the state can perform these tests.

3.2.2 State principal laboratories or laboratories accredited by the state should supply containers, preservatives, and any field reagent blanks for sampling. These containers, blanks, and preservatives must be free of contaminants at the detection levels of each parameter of interest.

3.3 Number and Frequency of Drinking Water Samples

The number of drinking water samples to be collected is determined by each state's water supply program. The state program will notify the water system in advance about which analyses are required and when and where they should be taken. This information is also available on the Water Supply Engineering Bureau (WSEB) website at

www.des.state.nh.us:1522/des/ONESTOP.WSEB_INVENTORY_RPT.SHOW_PARMS.

The federal drinking water regulations can be found in Section 40 of *The Code of Federal Regulations (CFR)*, Part 141 and Part 143. State regulations can be obtained from the WSEB or the DES Public Information Center (PIC) office.

3.4 Sampling Locations

The location for sample collection depends on:

- the water source
- analyses to be performed
- purpose of the testing
- regulatory requirements

Samples may be collected from the source prior to treatment, at the point of entry (before or after treatment), at the point of use (at the tap), or within the distribution system. For example, volatile organic compound (VOC) sampling is performed at the entry point of the distribution system. Lead and copper samples are taken at the point of use. The appropriate sampling point is determined by the State based on the criteria listed above.

The state assigns sampling sites for each type of test. In the absence of state approved sample sites, samples should be taken at an appropriate entry or distribution point to the system after treatment. The goal is to have a sample that is representative of the water delivered to the consumer.

3.5 Paperwork Submitted with Samples

Appropriate paperwork must accompany all samples to the laboratory. The state requires specific information to identify the sample and where and when it was taken. These forms can be obtained from the WSEB or NHDES Lab or on the WSEB website listed above. As a reminder, the submittal of any paperwork, which is incomplete or inaccurate, may result in the rejection of the sample by either WSEB or the laboratory.

3.6 Analytical Methods

When samples are submitted to accredited laboratories for analysis, the water system must notify the lab that the samples are for drinking water compliance purposes to ensure that appropriate methods are used and that the data are transmitted to WSEB.

3.7 Sampling and Safety Tips to Help Meet Requirements

3.7.1 All samples should be taken at cold water faucets that are not threaded or swiveled. Also, faucet aerators and screens should be removed before taking samples. Anything attached to the end of the faucet, e.g. hoses, should be removed before taking samples.

3.7.2 Ice is not a packing material. Glass sample bottles should be wrapped in bubble wrap or other protective material to prevent breakage during shipping.

3.7.3 Chemical fumes from any source can potentially contaminate samples. Whenever sampling, the sampler should be conscious of his/her surroundings. For example, samples should not be taken in the vicinity of motor exhaust from any pump or vehicle because it will contaminate them. Also, if sampling for volatile organic compounds

(VOCs), it is not advisable to refuel vehicles either on the way to the site or while the samples are being transported to the lab.

3.7.4 Sample containers can become contaminated if the inside of the cap is touched or if the septum of a radon or VOC vial is reversed. All containers must be kept closed until ready for use.

3.7.5 It is highly recommended that safety eye protection and gloves be worn while collecting samples. Many of the chemicals used to preserve samples are highly acidic or caustic. They can cause severe burns to eyes, skin and clothing if they are splashed or spilled. Sometimes these chemicals are added to the samples in the field. However, they may already be in the “empty” containers when they are obtained from the lab. The gloves of choice (should be phthalate-free) are made from nitrile. Many other types of gloves contain phthalates, which can contaminate synthetic organic compound (SOC) samples. If collecting samples for SOCs without nitrile gloves, the sampler must remove all gloves and wash his/her hands before collecting the samples.

3.7.6 Water should be allowed to run for 4-5 minutes or until the water temperature has stabilized, whichever is longer, before the water samples are collected. A thermometer may be used to monitor the temperature.

3.7.7 A ballpoint pen or waterproof marker should be used when writing on sample tags to reduce the bleeding of ink. If icing is required, samples should be placed on ice immediately after collection. Placing samples in zip lock plastic bags prior to icing helps with sample organization, avoids wet sample tags, and results in less confusion when the samples reach the laboratory.

3.7.8 Well pits, ditches, and below-ground pumping stations, pipe raceways and vault systems are extremely dangerous sources from which to collect samples. Before entering confined spaces of any type, samplers must comply with the requirements of 29 CFR 1910.146, Permit Required Confined Space. Specially trained samplers and backup teams are required when sampling in a confined space.

3.7.9 In general, preserved water samples are known environmental samples and are typically exempt from DOT and IATA (aircraft) shipping requirements. However, these regulations must be observed when shipping the preservatives or pre-preserved bottles via ground or air. When mailing samples to the laboratory, place a “water sample” label on the package; samples that leak cause great consternation at the Post Office and for others that handle must the package.

3.7.10 Sample containers that have preservatives in them should be labeled accordingly. The specific chemicals should be identified. This applies to empty containers to which preservatives are added before use as well as containers filled with sample.




New Hampshire
Sample Collection & Preservation Manual
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Drinking Water



**Part 2. Sampling Containers, Preservatives, and Hold
Times**



NHDES Laboratory Sample Containers for Public Water Supplies



All Inorganics and Organics Samples should be preserved at 4°C or lower.





All Microbiological Samples should be preserved at 10°C or lower.

TEST	CONTAINER		PRESERVATIVE IN BOTTLE	HOLD TIME
Bacteria		125mL plastic with sterile seal Must be filled at least 100mL	Sodium thiosulfate pellet	30 Hours
NO ₃ /NO ₂ (Nitrate/ nitrite)		40mL plastic “specimen” container	No preservation	48 Hours
Pb/Cu (Lead and Copper)		1000mL square plastic	No preservation	14 Days (6 months once preserved in lab)

TEST	CONTAINER		PRESERVATIVE IN BOTTLE	HOLD TIME
IOC		Metals	5mL conc HNO ₃ (to pH<2)	6 Months
		500mL square plastic		
		Anions, pH, alkalinity	No preservation	pH: ASAP NO ₂ /NO ₃ : 48 Hours Alkalinity: 14 Days Rest: 28 Days
		500mL cloudy oblong plastic		
		Cyanide		
		100mL cloudy pear shaped plastic	3 pellets NaOH	14 Days
VOC		2-40mL glass vials with Teflon septa	<u>Nonchlorinated:</u> 0.25mL 1:1 HCl	14 Days
			<u>Chlorinated:</u> 25mg ascorbic acid	

TEST	CONTAINER		PRESERVATIVE IN BOTTLE	HOLD TIME
SOC	Nonchlorinated System 	Pesticides 2-1L amber glass bottles	<u>Nonchlorinated:</u> 2 mLs HCl, pH2	14 Days
			<u>Chlorinated:</u> 40mg sodium sulfite	
		Herbicides 2-40mL glass vials with Teflon septa	<u>Nonchlorinated:</u> 0.25mLs HCl, pH2	
			<u>Chlorinated:</u> 4mg sodium sulfite	
	Chlorinated System 	Carbamates 1-40mL glass vial with Teflon septa	<u>Nonchlorinated:</u> 50mg potassium tartrate	
			<u>Chlorinated:</u> 5mg sodium sulfate and 50mg potassium tartrate	
		Glyphosate 1-40mL glass vial with Teflon septa	<u>Nonchlorinated:</u> 3mg sodium thiosulfate	
			<u>Chlorinated:</u> 3mg sodium thiosulfate	
		Pest 504/505 2-40mL glass vials with Teflon septa	<u>Nonchlorinated:</u> 3mg sodium thiosulfate	
			<u>Chlorinated:</u> 3mg sodium thiosulfate	

TEST	CONTAINER		PRESERVATIVE IN BOTTLE	HOLD TIME
Radiological		Gross Alpha Radium 226 Uranium	No preservation	5 Days (6 months once preserved in lab)
		Radon 40mL glass vial with Teflon septa	No preservation	3Days (ASAP)
Standard		white plastic jug with handle, labeled “sterile container”	No preservation	Bacteria: 30 Hours NO ₂ /NO ₃ : 48 Hours

TEST	CONTAINER		PRESERVATIVE IN BOTTLE	HOLD TIME
Fluoride		20mL plastic “specimen” container	No preservation	28 Days
TTHM		2-40mL glass vials with Teflon septa	3mg sodium thiosulfate	14 Days
HAA5		2-60mL amber glass vials with Teflon septa	6mg ammonium chloride	14 Days
TOC		2-40mL amber glass vials with Teflon septa	0.5mL 9N H ₂ SO ₄ (to pH<2)	28 Days

New Hampshire
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Part 3. Individual Sampling Standard Operating Procedures

NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

MICROBIOLOGY

READ INSTRUCTIONS CAREFULLY.

LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets and swivel faucets.
2. **Sampling materials:**
 - Containers:** Sterile plastic bottle with a minimum capacity of 125mL.
 - Preservative:** Sodium thiosulfate in powder or tablet; ice.
 - Other:** Labels and marker.
3. **Safety Concerns:** None.
4. **Sample Collection Procedure:**
 - a. Remove aerator, screen, hose and strainer from the faucet.
 - b. If necessary, a lint free cloth dampened with bleach and water may be used to clean the faucet rim.
 - c. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow to eliminate splashing and air bubbles. The stream of water should be no greater than 1/8 inch in diameter.
 - d. Carefully remove cap. Do not put cap face down or put it in a pocket. Do not allow inside of cap or bottle to be touched by any object.
 - e. Do **NOT** rinse the bottle or remove any liquid or tablets in the bottom of the container. This may be the preservative.
 - f. Fill container to just below neck of bottle, leaving an ample airspace. **Be sure bottle contains at least 100mLs of sample.**
 - g. Carefully replace cap on container and tighten securely.
 - h. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection must be submitted.**
5. **Shipping and handling:**
 - a. Refrigerate at less than 10 deg.C., but do not freeze sample.
 - b. Keep samples in a clean closed chest out of sunlight.
 - c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - d. Maximum holding time is 30 hours.

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

NITRATE & NITRITE

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED
CONFIRM INSTRUCTIONS WITH LAB BEFORE SAMPLING. WASH HANDS.

SPECIAL NOTE: If a sample contains chlorine, it cannot be analyzed for nitrite. Results from these samples will be reported as Nitrate + Nitrite.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. For chlorinated systems, the sample should be taken from a tap before the chlorinator.
2. **Sampling Materials:**
 - Container:** Pre-cleaned plastic or glass bottle (usually 40mL).
 - Preservatives:** Ice.
 - Other:** Labels, marker.
3. **Safety Concerns:** None.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove bottle cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
 - d. Fill bottle to shoulder; screw cap on securely.
 - e. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection must be submitted.**
5. **Shipping and Handling:**
 - a. Keep sample in closed chest with ice at 4 deg. C.
 - b. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - c. The maximum holding time to analysis is 48 hours. The lab needs the sample at least an hour in advance of 48 hours to complete sample preparation

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

LEAD AND COPPER

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS.

SPECIAL NOTE: Lead and Copper samples must be scheduled with the laboratory prior to collection. Call the lab at 271-3445 for an appointment.

1. **Sample Location:** State-approved locations.
2. **Sampling Materials:**
 - Containers:** Pre-cleaned 1 liter square plastic bottle.
 - Preservatives:** None.
 - Other:** Labels and marker.
3. **Safety Concerns:** None.
4. **Sample Collection Procedure:**
 - a. Each first draw tap sample must have stood motionless in the plumbing system of the sampling site for at least six hours.
 - b. Remove bottle cap and turn on cold water.
 - c. Fill bottle to shoulder.
 - d. Screw cap on securely.
 - e. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**
5. **Shipping and Handling:**
 - a. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm
 - b. The maximum hold time is 14 days.

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

INORGANIC CHEMICALS (IOCs)

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED
CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

SPECIAL NOTES:

-IOC samples must be scheduled with the laboratory prior to collection. Call the laboratory at 271-3445 for an appointment.

-Chlorinated systems must take cyanide samples from tap before the chlorinator.

-If sampling for a new system, an additional sample must be collected for bacteria analysis.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. If samples will be taken from a chlorinated system, the sample for cyanide must be taken from a tap before the chlorinator. All other samples from chlorinated systems should be taken from the designated site.
2. **Sampling Materials:**
Containers: Total of 3 containers: One pre-cleaned 500 mL square plastic bottle for metals, one 100 mL pear-shaped plastic bottle for cyanide and one 500 mL plastic bottle for anions, alkalinity and pH.
Preservatives: Ice; 5 mL of concentrated nitric acid added to metals container; 3 pellets of sodium hydroxide added to cyanide container; no preservative in anion container.
Other: Labels and marker.
3. **Safety Concerns:** Caution! Nitric acid is a strong acid and will cause burns. Sodium hydroxide is a strong base and will cause burns. Caution! "Empty" sample containers contain acid or base. Open them slowly and carefully.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove bottle cap of container labeled Anions. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
 - d. Fill bottle to shoulder.
 - e. Screw cap on securely.

- f. Complete sample tag.
- g. Repeat steps 4c through 4f with bottle labeled Metals.
- h. Repeat steps 4c through 4f with the bottle labeled Cyanide.
- i. Complete sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection must be submitted.**

5. Shipping and Handling:

- a. Keep samples in closed chest.
- b. Samples must be kept on ice at 4°C.
- c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

VOLATILE ORGANICS (VOCs) (Method 524.2)

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

SPECIAL NOTE: If a VOC sample is to be taken from a tap after a chlorination system, notify lab so that you obtain vials with appropriate preservative.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location which is representative of the distribution system.
2. **Sampling Materials:**
 - Containers:** Two pre-cleaned 40-mL glass septum vials with Teflon septa each sample site.
 - Preservative:** 0.25 mL of 1:1 Hydrochloric acid or 25 mg ascorbic acid (for chlorinated systems) added to vials before shipment to the field, ice.
 - Other:** Labels, marker, pH test strip paper, and field reagent blanks (do not open them).
3. **Safety Concerns:** Caution! Hydrochloric acid is a strong acid and will cause burns. Caution! "Empty" sample vials may contain acid. Open them slowly and carefully.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from the faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
 - d. **If you are certain that no chlorine is present, proceed to step 4e. If chlorine is present, go to 4j.**
 - e. Use vials marked preserved with 1:1 hydrochloric acid. Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.
 - f. Carefully hook cap over the top of the vial, trying to match the threads. The Teflon side of the septum must be facing the sample (Teflon side is smooth and shiny).
 - g. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add more water. (Note: Samples with bubbles larger than a pea cannot be analyzed.)
 - h. Shake sample for one minute.
 - i. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**

- j. **If chlorine is present in system, then use vials marked preserved with ascorbic acid** (these vials must be requested from lab at time of sample container pickup.)
- k. Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.
- l. Carefully add 2 drops of the provided 1:1 hydrochloric acid to the center of the water surface (i.e., to the meniscus). The acid will sink to bottom of vial, displacing 2 drops of sample.
- m. Continue with steps 4f through 4i.

5. **Shipping and Handling:**

- a. Keep samples in closed chest at 4°C away from direct light and solvent vapors.
- b. Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.
- c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
- d. The maximum holding time is 14 days.

**** Please dispose of empty preservative vials properly; rinse container several times with clean water and place glass container in recycling bin or trash.**

rev: Oct 2001

NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

SYNTHETIC ORGANIC CHEMICALS (SOCs)

Methods: 504, 505, 525.2, 531.1, 547 and 555

READ INSTRUCTIONS CAREFULLY.

LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

SPECIAL NOTE: SOC samples must be scheduled with the laboratory prior to collection. Call the lab at 271-3445 for an appointment.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location which is representative of the distribution system.
2. **Sampling Materials:**
Containers: **A total of 8 containers including: 2 pre-cleaned one-liter amber glass bottles with Teflon-lined caps and 6 pre-cleaned 40mL vials with Teflon-lined caps for each sampling site.**
Preservatives: Ice; granular sodium thiosulfate, sodium sulfite, and/or potassium tartrate; hydrochloric acid added to appropriate bottles. **For specific preservatives, refer to page 3 of this method.**
Other: pH test strip paper, markers, labels and field reagent blanks.
3. **Safety Concerns:** Caution! "Empty" sample bottles contain special preservatives. Open them slowly and carefully. Caution! Hydrochloric acid is a strong acid and can cause burns.
4. **General Sample collection procedure:**
 - a. Refer to the sample container matrix for this method to correctly associate bottles and preservatives for either a **chlorinated** or **non-chlorinated** system.
 - b. Turn on cold water tap and run water for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. For each one liter bottle labeled Pest-525: Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object. Do not rinse bottle. Fill bottle to shoulder. If chlorine is not present in the system, proceed to step 4e
 - d. If chlorine is present in the system, carefully add 2mLs of the 6N hydrochloric acid provided and check that the pH is 1-2.
 - e. Screw cap on securely.
 - f. Complete sample tag.
 - g. For each of the 40mL vials: Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of vial or bottle threads to be touched by any object. Do not rinse vial. Fill vial carefully to just overflowing, but do not flush out the preservative. If chlorine is not present in the system, proceed to step 4i.

- h. If chlorine is present in the system, carefully add the correct acid preservative provided as specified in the table of this method; check that the final sample pH is the value for the method.
- i. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add additional sample.
- j. Field blanks- are treated same as sample.
- k. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**

5. Shipping and Handling:

- a. Keep samples in closed chest at 4 deg. C. away from direct light and solvent vapors.
- b. Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.
- c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
- d. The maximum hold time is 14 days.

rev: Oct 2001

SYNTHETIC ORGANIC CHEMICALS (SOCs)

SAMPLE BOTTLES AND PRESERVATIVES

NON-CHLORINATED SYSTEMS:

BOTTLE LABEL	# BOTTLES	PRESERVATIVE IN BOTTLE	PRESERVATIVE TO BE ADDED IN FIELD	STORAGE
Pest-525	2x 1L amber glass bottles	2 mLs HCl pH 2	none	4°C away from sunlight
Carbamates	1x 40mL glass vials	50mg potassium tartrate	none	4°C
Glyphosate	1x 40mL glass vial	3mg sodium thiosulfate	none	4°C away from sunlight
Herbicides	2x 40ml glass vials	0.25 mLs HCl pH2	none	4°C away from sunlight
Pest-504/505	2x 40ml glass vials	3mg sodium thiosulfate	none	4°C away from sunlight

CHLORINATED SYSTEMS:

BOTTLE LABEL	# BOTTLES	PRESERVATIVE IN BOTTLE	PRESERVATIVE TO BE ADDED IN FIELD	STORAGE
Pest-525	2x 1L amber glass bottles	40 mg sodium sulfite	2 mLs HCl; pH1-2	4°C away from sunlight
Carbamates	1x 40mL glass vials	5mg sodium thiosulfate and 50mg potassium tartrate	none	4°C
Glyphosate	1x 40mL glass vial	3mg sodium thiosulfate	none	4°C away from sunlight
Herbicides	2x 40ml glass vials	4mg sodium sulfite	0.25 mLs HCl; pH 2	4°C away from sunlight
Pest-504/505	2x 40ml glass vials	3mg sodium thiosulfate	none	4°C away from sunlight

** Please dispose of empty preservative vials properly; rinse container several times with clean water and place glass container in recycling bin or trash.

NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

RADON

READ INSTRUCTIONS CAREFULLY.

LAB MAY REJECT SAMPLES OF ALL INSTRUCTIONS ARE NOT FOLLOWED.

CONFIRM SCHEDULING AND INSTRUCTIONS BEFORE SAMPLING.

WASH HANDS.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location which is representative of the distribution system.
2. **Sampling Materials:**
 - Containers:** Pre-cleaned 40-mL glass septum vial with Teflon-lined septum.
 - Preservative:** Ice.
 - Other:** Labels and marker.
3. **Safety Concerns:** None.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from the faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
 - d. Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.
 - e. Carefully hook cap over the top of the vial, trying to match the threads. The Teflon side of the septum must be facing the sample (Teflon side is smooth and shiny).
 - f. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, empty the vial and repeat sampling procedure, beginning with step 4d. (Note: Samples with bubbles cannot be analyzed.)
 - g. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**
5. **Shipping and Handling:**
 - a. Keep samples in closed chest at 4°C away from direct light and solvent vapors.
 - b. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - c. The maximum holding time is 3 days.

rev: Oct 2001

NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

RADIONUCLIDES (Gross Alpha, Radium, and Uranium)

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES OF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM SCHEDULING AND INSTRUCTIONS BEFORE SAMPLING.
WASH HANDS.

SPECIAL NOTES:

-Radiological analysis for the Safe Drinking Water Act includes testing for both the Radionuclides and Radon (see separate Radon collection sheet).

-If the result for Gross Alpha is equal to or greater than 5pCi/L, the lab will automatically test for Radium 226; if the result is equal to or greater than 15pCi/L, the lab will automatically test for Uranium and Radium 226.

-Radiological samples must be scheduled with the laboratory prior to collection. Call the lab at 271-3445 for an appointment.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system.
2. **Sampling Materials:**
 - Containers:** One pre-cleaned 1-gallon plastic bottle or two pre-cleaned 2-liter plastic bottles.
 - Preservative:** None. (Samples will be acidified upon receipt at laboratory as necessary.)
 - Other:** Labels and marker.
3. **Safety Concerns:** None.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from the faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
 - d. Fill bottle to the shoulder.
 - e. Screw cap on securely.
 - f. Complete sample tag and sample collection form, using waterproof ink. sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**
5. **Shipping and Handling:**
 - a. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - b. The maximum holding time is 6 months.

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

TOTAL TRIHALOMETHANES (TTHMs) (Method 524.2)

READ INSTRUCTIONS CAREFULLY.

LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.

CONFIRM INSTRUCTIONS WITH LAB BEFORE SAMPLING.

WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location which is representative of the distribution system.
2. **Sampling Materials:**
 - Containers:** Two pre-cleaned 40-mL glass septum vials with Teflon septa for each sampling site.
 - Preservative:** 3 mg of granular sodium thiosulfate added to bottles before shipment to the field; ice.
 - Other:** Labels, marker, and field reagent blanks (do not open them).
3. **Safety Concerns:** Caution! "Empty" sample bottles will contain special preservatives. Open them slowly and carefully.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from the faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
 - e. Use vials marked preserved with sodium thiosulfate. Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.
 - f. Carefully hook cap over the top of the vial. The Teflon side of the septum must be facing the sample. (Teflon side is smooth and shiny).
 - g. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add more water. (Note: Samples with bubbles larger than a pea cannot be analyzed.)
 - h. Shake sample for one minute.
 - i. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**
5. **Shipping and Handling:**
 - a. Keep samples in closed chest at 4°C away from direct light and solvent vapors.
 - b. Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.
 - c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - d. The maximum holding time is 14 days.

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

HALOACETIC ACIDS (HAA5) (Method 552.1)

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system.
2. **Sampling Materials:**
 - Containers:** Two pre-cleaned 60-mL amber glass septum vials with Teflon septa for each sampling site.
 - Preservative:** 6 mg of granular ammonium chloride added to bottles before shipment to the field; ice.
 - Other:** Labels, marker
3. **Safety Concerns:** Caution! "Empty" sample bottles will contain special preservatives. Open them slowly and carefully.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from the faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
 - d. Fill each vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.
 - e. Carefully hook cap over the top of the vial. The Teflon side of the septum must be facing the sample. (Teflon side is smooth and shiny).
 - f. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add more water. (Note: Samples with bubbles cannot be analyzed.)
 - g. Shake sample for one minute.
 - h. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**
5. **Shipping and Handling:**
 - a. Keep samples in closed chest at 4°C away from direct light and solvent vapors.
 - b. Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.
 - c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - d. The maximum holding time is 14 days.

NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

TOTAL ORGANIC CARBON (TOC) (Method 5310B)

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

SPECIAL NOTE: TOC samples should be collected and delivered to the lab the first week of the month.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location which is representative of the distribution system.
2. **Sampling Materials:**
 - Containers:** Two pre-cleaned 40-mL amber glass septum vials with Teflon septa for each sampling site.
 - Preservative:** 0.5 mL of 9N Sulfuric acid added to bottles before shipment to the field; ice.
 - Other:** Labels, marker.
3. **Safety Concerns:** Caution! "Empty" sample containers contain sulfuric acid which is a strong acid and will cause burns. Open them slowly and carefully.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from the faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove container cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of bottle or bottle threads to be touched by any object.
 - e. Fill vial carefully until water is actually above the vial rim. (This will prevent the formation of an air pocket in the vial.) Gently tap the vial to dislodge any air bubbles.
 - f. Carefully hook cap over the top of the vial. The Teflon side of the septum must be facing the sample (Teflon side is smooth and shiny).
 - g. Screw cap on securely. Check for air bubbles by inverting the vial and gently tapping the cap. If bubbles are present, add more water. (Note: Samples with bubbles cannot be analyzed.)
 - h. Shake sample for one minute.
 - i. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including project number and location, and the date and time of collection, must be submitted.**
5. **Shipping and Handling:**
 - a. Keep samples in closed chest at 4°C away from direct light and solvent vapors.
 - b. Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.
 - c. If possible, deliver sample to lab the same day. Lab hours are 8am to 4pm.
 - d. The maximum holding time is 28 days.

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NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

ASBESTOS

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED.
CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

SPECIAL NOTES: The NHDES Laboratory does not test for Asbestos. Special arrangements must be made with an accredited laboratory prior to sample collection.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location that is representative of the distribution system. Avoid threaded faucets and swivel faucets.
2. **Sampling Materials:**
Containers: Two unused, pre-cleaned 1-liter polyethylene or glass bottles. Minimum sample volume is two bottles with at least 800 mL per bottle.
Preservatives: Ice or refrigeration at 4 deg. C.
Other: Labels and marker.
3. **Safety Concerns:** None.
4. **Sample Collection Procedure:**
 - a. Remove aerator and screen from faucet.
 - b. Turn on cold water tap and run for 4 to 5 minutes or until the water temperature has stabilized, whichever is longer. Then reduce flow so that stream of water is no greater than 1/8 inch in diameter.
 - c. Remove first bottle cap. Do not put cap face down or in pocket. Do not allow inside of cap, inside of container or bottle threads to be touched by any object.
 - d. Rinse each sample bottle several times with source water. (Do not rinse if taking depth samples from a storage tank). Fill both bottles to approximately 4/5 full.
 - e. Replace container cap securely.
 - f. Complete sample tag and sample collection form, using waterproof ink. **Proper identification, including the project number and location, and date and time of collection must be submitted.**
 - g. Complete chain-of-custody form if requested by lab.
5. **Shipping and Handling:**
 - a. Ship in a cooler with ice to avoid excessive bacterial or algal growth.
 - b. Deliver samples to lab the same day if possible at a time acceptable to lab.
 - c. The maximum holding time is 48 hours.

NEW HAMPSHIRE'S DRINKING WATER SAMPLE COLLECTION & PRESERVATION

DIOXIN (for analysis by EPA Method 1613, Revision B)

READ INSTRUCTIONS CAREFULLY.
LAB MAY REJECT SAMPLES IF ALL INSTRUCTIONS ARE NOT FOLLOWED!
CONFIRM SCHEDULING AND INSTRUCTIONS WITH LAB BEFORE SAMPLING.
WASH HANDS. WEAR SAFETY GLASSES AND CLEAN NITRILE GLOVES.

SPECIAL NOTE: The DES Laboratory does not analyze for dioxin. Special arrangements must be made with an accredited laboratory prior to sample collection.

1. **Sample Location:** A state-approved location. If one has not been designated, select an appropriate location which is representative of the distribution system. Avoid threaded faucets and swivel faucets.
2. **Sampling Materials:**
 - Containers:** Four 1-liter amber glass bottles with teflon-lined caps for each sample. Bottles and caps must be pre-cleaned according to Sec. 6.1.1 of Method 1613. Bottle blanks must also be taken. Seek specific instructions from lab performing the analysis before sampling.
 - Preservative:** Sodium thiosulfate (80 mg/L), sulfuric acid, ice.
 - Other:** Labels and marker.
3. **Safety Concerns:** "Empty" sample containers may contain sulfuric acid. Place container upright; then open it slowly and carefully.
4. **Sample Collection Procedure:**
 - a. **Caution:** The slightest contamination will invalidate the sample.
 - b. Remove aerator and screen from the faucet.
 - c. Turn on cold water tap and run for 4 to 5 minutes or until water temperature has stabilized, whichever is longer. Then reduce flow to eliminate splashing and air buThe stream of water should be no greater than 1/8 inch in diameter.
 - d. Carefully remove cap. Do not put cap face down or put it in a pocket. Do not allow inside of cap or bottle to be touched by any object.
 - e. Fill bottle to shoulder, leaving room for preservatives and mixing. Do not rinse bottle.
 - f. **If you are certain that no chlorine is present, skip to step 4j.** Otherwise, go to step 4g.
 - g. Place a drop of sample on KI-starch paper. If a blue color appears, proceed to step 4h. Otherwise, skip to step 4j.
 - h. Add 80 mg. sodium thiosulfate per liter.
 - i. Stir or shake sample until sodium thiosulfate is dissolved. Repeat step 4g.
 - j. If pH is greater than 9, adjust to pH 7 - 9 with sulfuric acid.
 - k. Screw cap on securely.
 - l. Complete sample tag and sample collection form, using waterproof ink. **If proper identification (date and time of sampling) is not submitted, the sample can not be analyzed.**
 - m. Complete chain-of-custody form if requested by lab or water supply program.
5. **Shipping and Handling:**
 - a. Keep samples in closed chest with ice or ice packs at 4°C. from time of sampling until receipt at lab. Holding time is 1 year if kept at 0 - 4 deg. C.

- b. Deliver samples to lab the same day if possible at a time acceptable to the lab.
Special instructions may be provided by lab performing the analysis.
- c. Ice is not a packing material. To prevent breakage, wrap glass bottles in bubble wrap or other protective material.

rev: Oct 2001

New Hampshire
Sample Collection & Preservation Manual
for
Drinking Water

Part 4. Material Safety Data Sheets (MSDS)

MSDS (Material Safety Data Sheets)

MSDS sheets are included in order for the following chemicals:

1. Ammonium chloride
2. Ascorbic acid
3. Hydrochloric acid
4. Nitric acid
5. Potassium bitartrate
6. Sodium hydroxide
7. Sodium sulfite
8. Sodium thiosulfate
9. Sulfuric acid